Space Weather Forecast

Issued on Tuesday, 30 August 2022 at 00:21 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further M-flares (R1-R2 Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Moderate, with five Moderate flares, all from a large active sunspot region which has now rotated off the SW limb. There are two sunspot regions left on the disc, however, with another large region in the central southern disc. This has remained inactive during the last 24 hours however, but does have some increased magnetic complexity. The other region is small, simple and declining. No Earth-directed coronal mass ejections (CMEs) are evident on available imagery. However a line of material (plasma) held above the Suns surface by its magnetic field, called a filament, was observed erupting near the sunspot this afternoon, and these type of eruptions often cause CMEs.

Solar Wind / Geomagnetic Activity: The solar wind showed the glancing arrival of a CME, likely alongside ongoing influence of the fast winds from a coronal hole. The CME arrival at 29/0256 UTC, only increased speeds from 420 km/s to 460 km/s, before a further increase to elevated levels, around 500-540 km/s occurred around 29/0900 UTC. The magnetic field strength increased from weak levels to be weak to moderate at the same time. It north-south component saw only brief moderate peaks in the southward direction, just after the CME arrived, before becoming mainly positive (northward).Geomagnetic activity was mainly Quiet to Unsettled, with one Active interval 29/0300-0600 UTC.

Energetic Particles / Solar Radiation: The count rather of energetic particles (high energy protons) were slightly above background due to the recent flaring of the large active sunspot, but below the solar radiation storm level (S1), and eased to background.

Four-Day Space Weather Forecast Summary

Solar Activity: Current Moderate activity is expected to ease, with the large, flaring sunspot no longer on the Earth-facing disc. However the large size of the other inactive spot, along with it having some magnetic complexity, gives an ongoing chance of Moderate activity continuing, and a slight chance of High activity due to any Strong flares that might occur.

Solar Wind / Geomagnetic Activity: There are currently no Earth-directed CMEs, however there is some uncertainty due to the filament eruption in the centre disc on the 29th. Current elevated solar winds, likely due to ongoing coronal hole sourced fast winds, are expected to gradually ease with no other significant enhancement forecast. Geomagnetic activity is currently expected to be mostly Quiet with isolated Unsettled spells, mainly at first, and slight chance of Active intervals early day 1 (30th)

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain below the Minor Radiation Storm level (S1). However there remains a slight chance of further increases to or above the S1 level, from any notable flares from either of the large sunspots, including the one which has now rotated off the Earth-facing disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	30	30	30	30
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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